Dayside Reconnection in LFM

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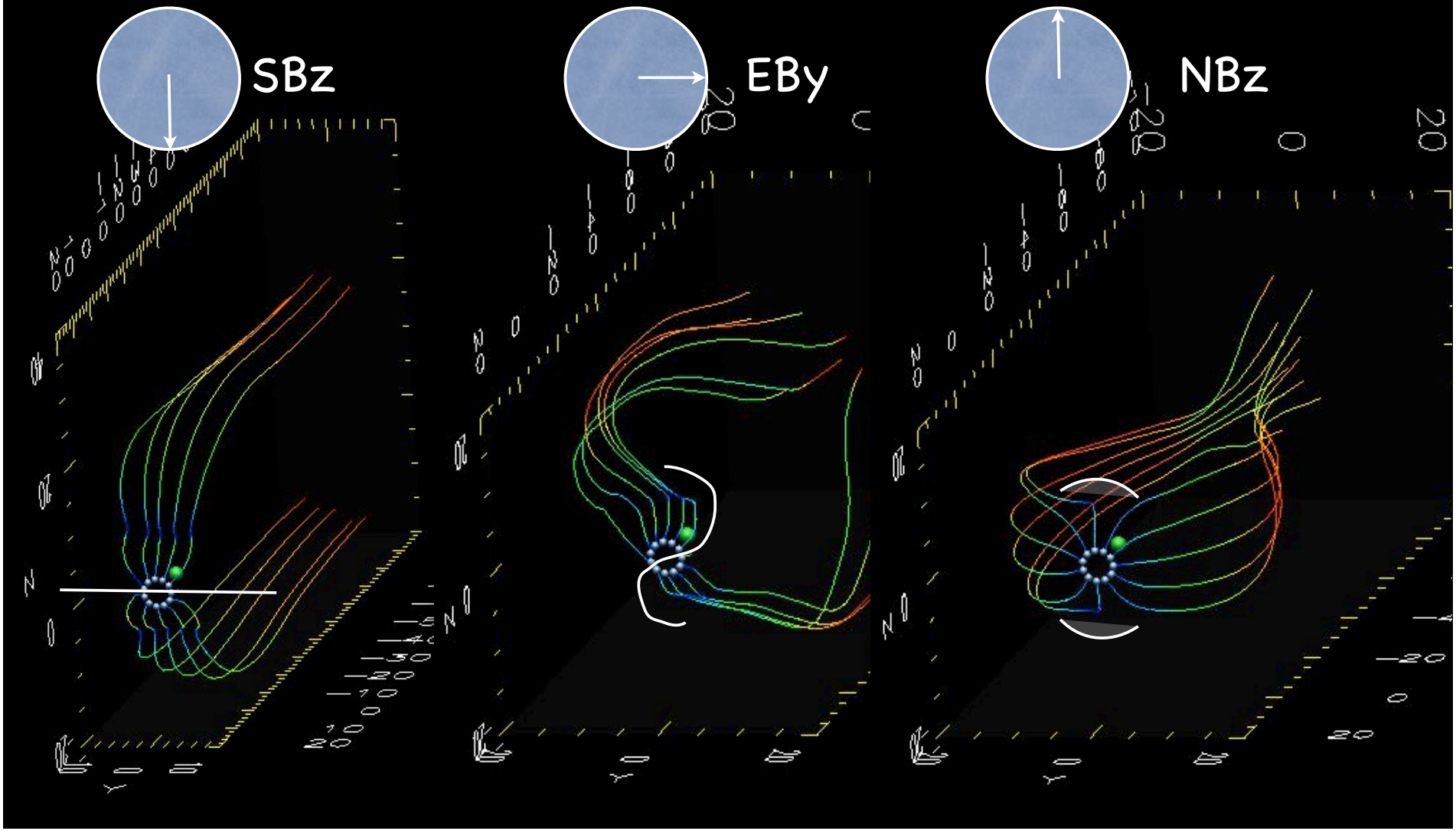
LFM solutions provided by
J. Fedder and S. Slinker
who don't support this interpretation
(yet)

Method

- Visualize the flow streamlines in LFM
- Use three simulations
  - One for NBz, one for EBy, one for SBz
- Look at how dayside streamlines vary
- Streamlines reveal X line by being deflected away from it and from the radially divergent flow they would have without reconnection

Dayside Reconnection in LFM vs IMF Clock Angle

- Near axial flow streamlines reveal X line



Dayside Reconnection in LFM vs IMF Clock Angle

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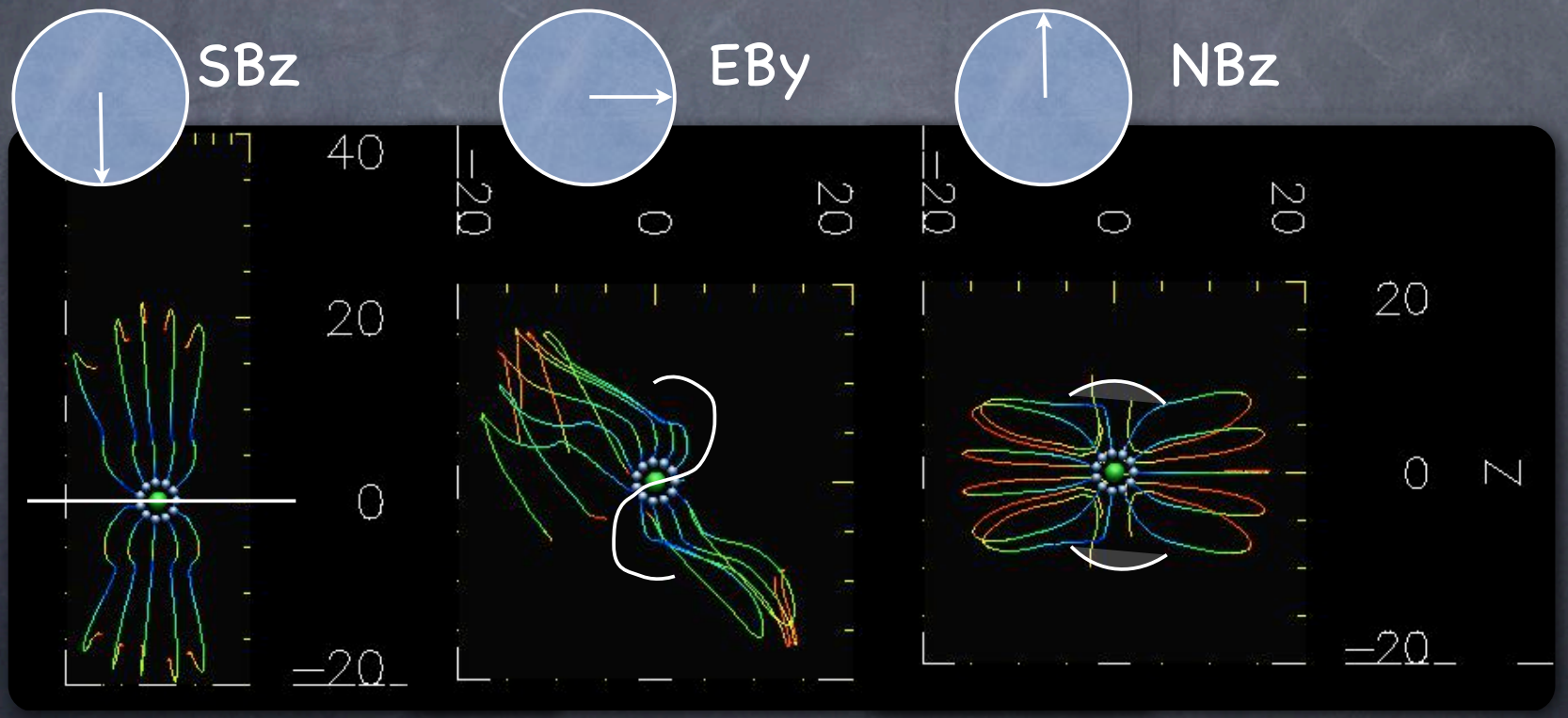
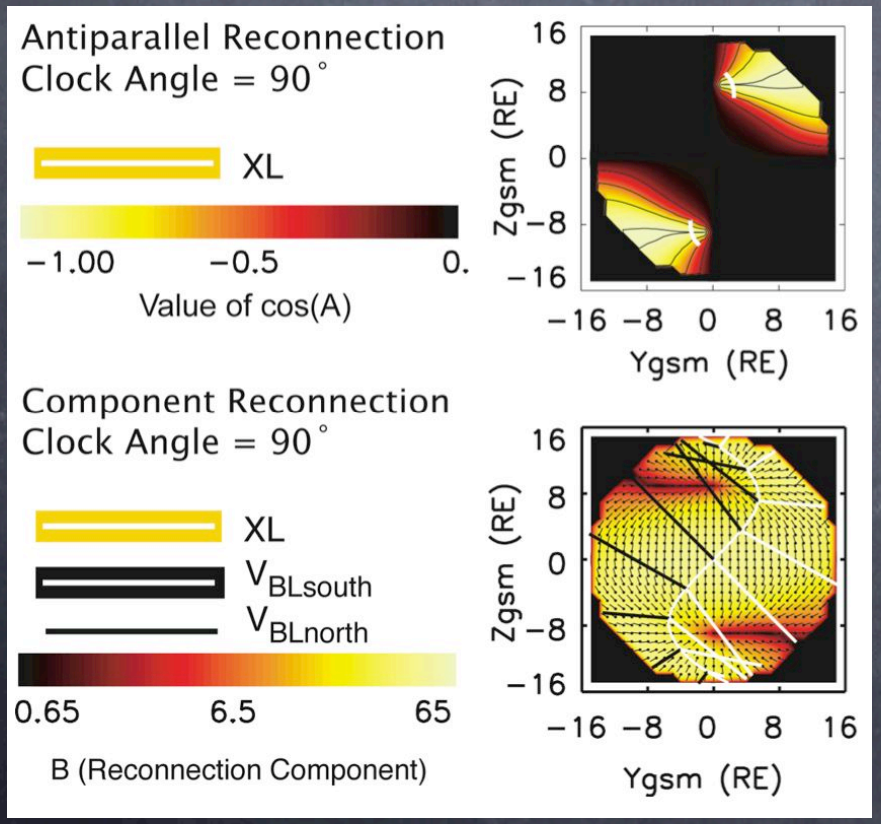
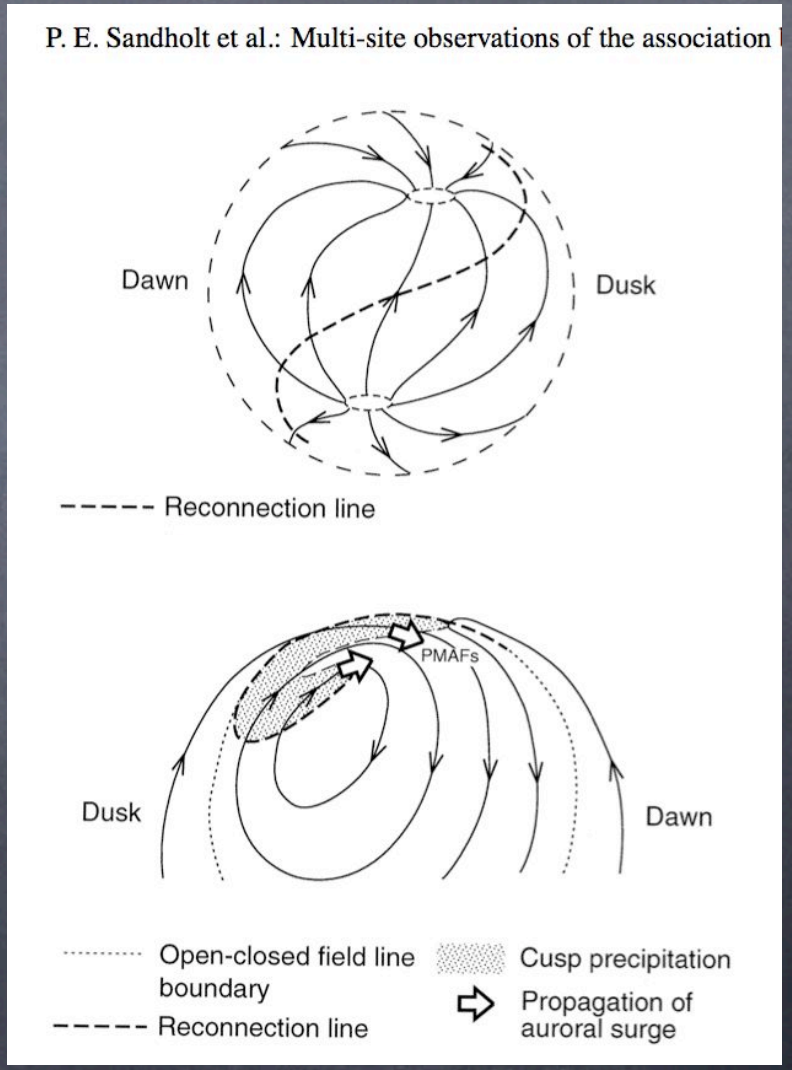


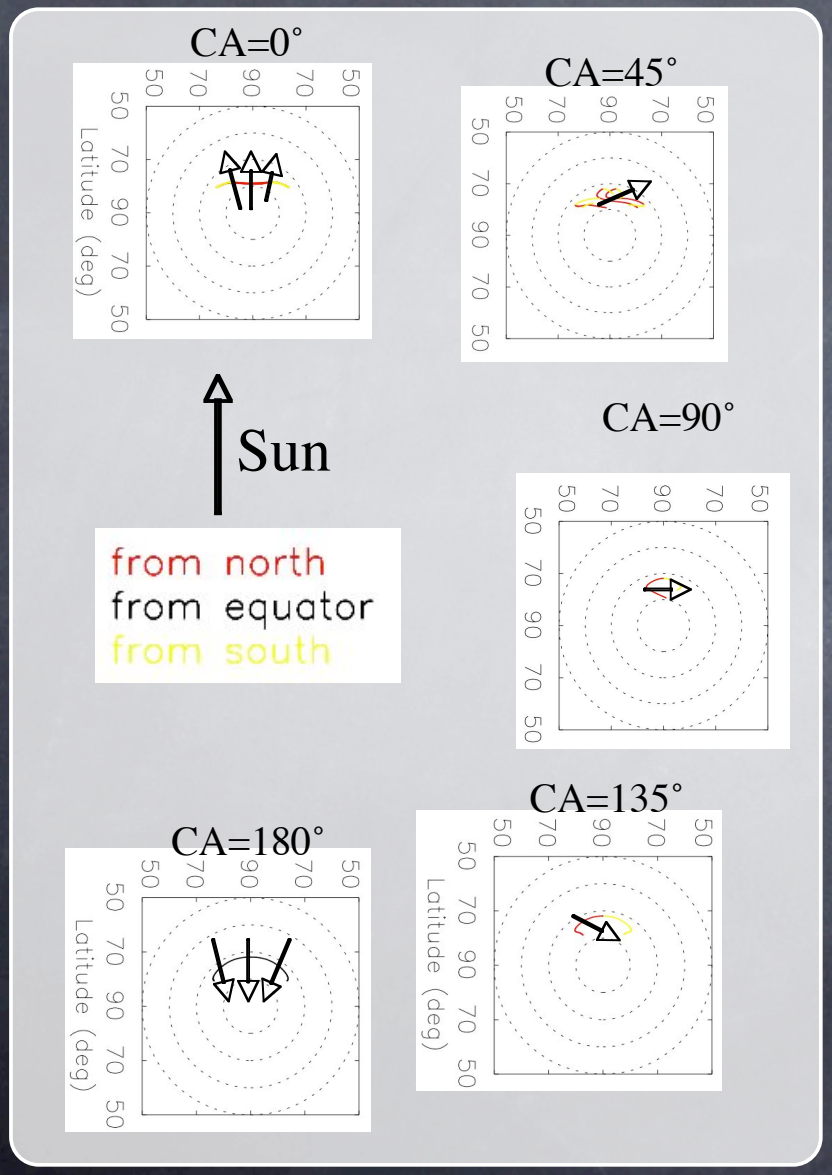
S or Z Shaped X line

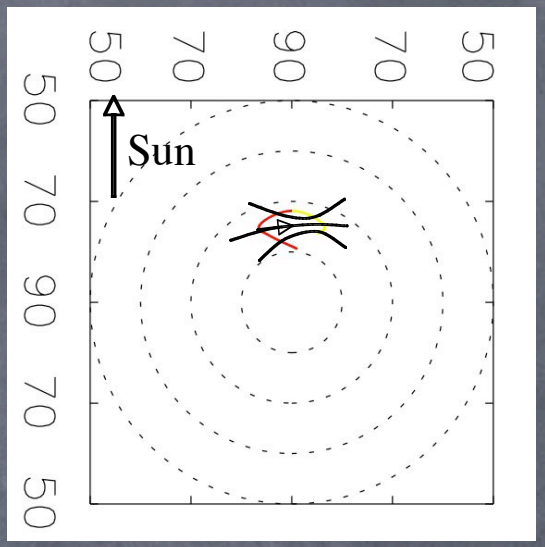
- Theory and observation point toward S or Z shaped X line





Ionospheric Footprint





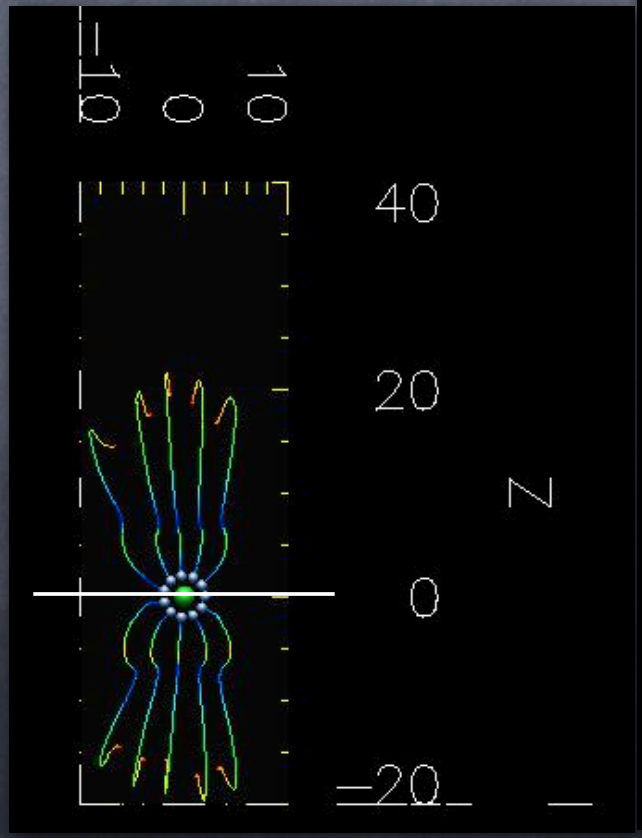
- Z or S shaped X line maps to reconnection "nozzles" in each ionosphere, oppositely directed "throat" flows

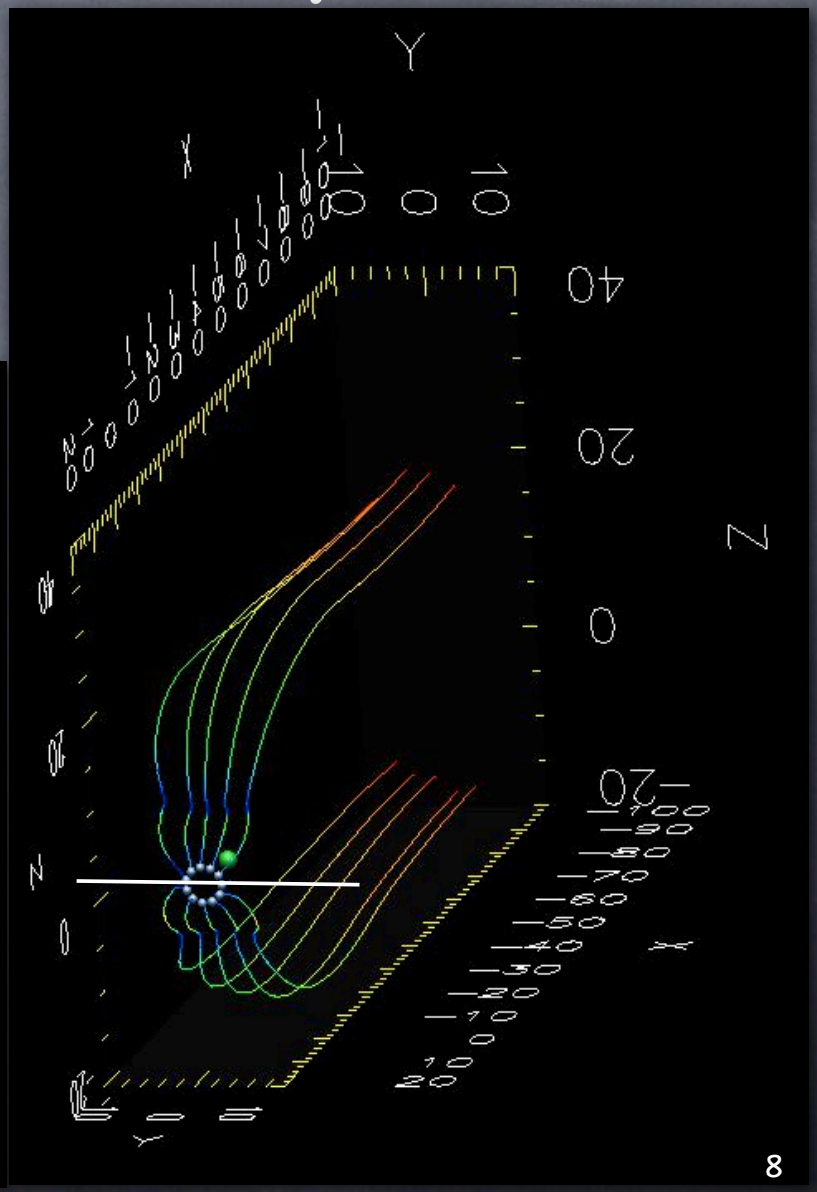
Conclusions

- LFM dayside reconnection in qualitative agreement with Moore et al. 2002 JGR
- X line follows current sheet streamline along ridge of maximal reconnecting component
- Consistent with X line as null connector, with rate smoothly varying along extended X line
- Cooling et al., 2001 JGR used Kobel and Flückiger [1994 JGR] magnetosheath field with qualitatively similar results.

SBz - Bz = -5nT, By = 0

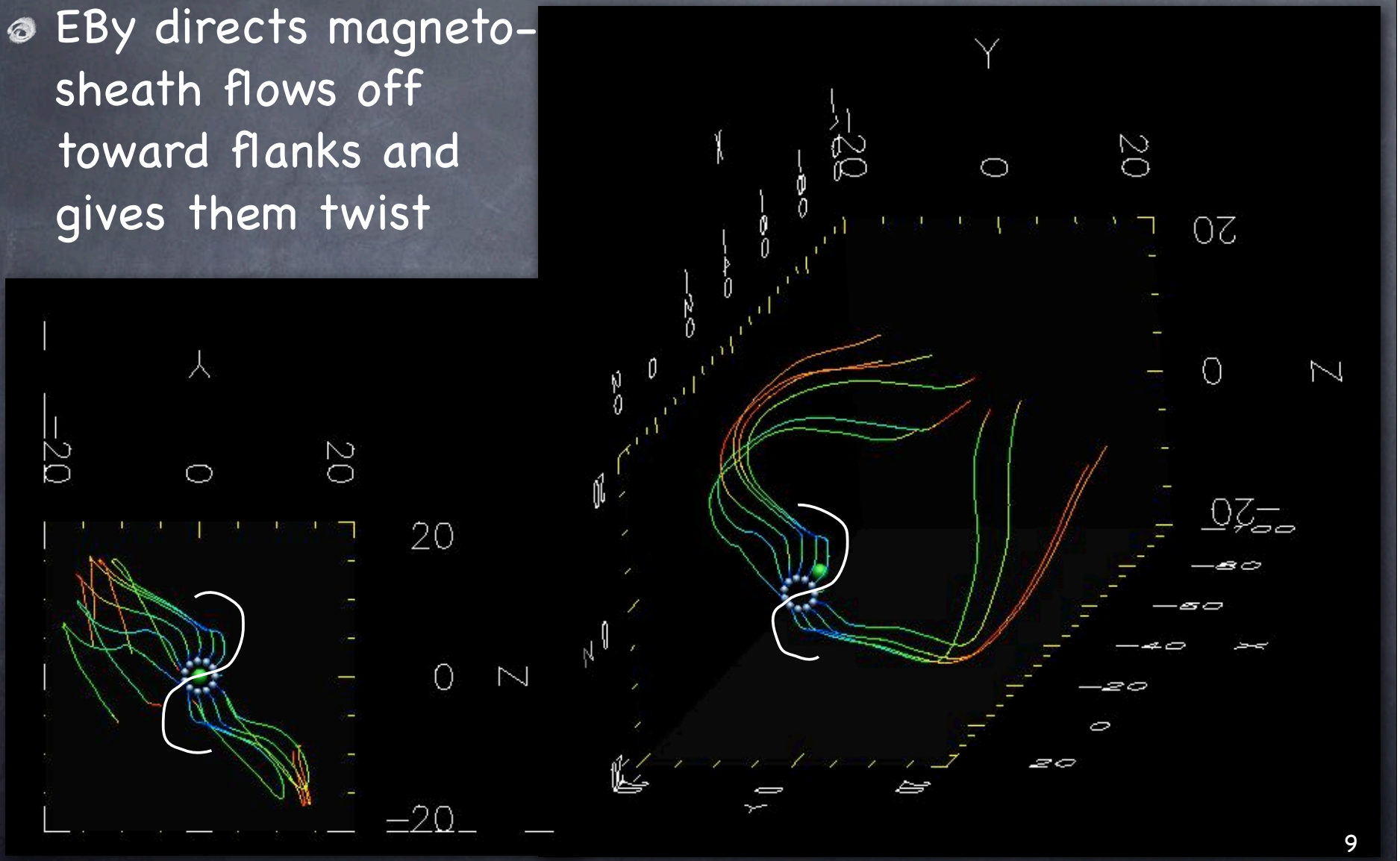
- SBz directs magnetosheath flows through the cusps and lobes





EBy - Bz = 0, By = 10nT

- EBy directs magneto-sheath flows off toward flanks and gives them twist



NBz - Bz = 5nT; By = 0

- NBz directs magnetosheath flows to the LLBL flanks, central plasma sheet